SUMMARY

JFSP project 09-1-01-09 (Landscape analysis of fuel treatment longevity and effectiveness in the 2006 Tripod Complex Fires)

In this study, we evaluated relationships between fire severity and fuel treatment type, age and size in the 2006 Tripod Complex fires. The 2006 Tripod Complex fires, which burned over 70,000 ha and involved over 380 past harvest and fuel treatment units, offer a relatively unique opportunity to assess fuel treatment efficacy under extreme fire weather conditions. A secondary objective was to evaluate other drivers of fire severity including landform, weather, vegetation, and past disturbances including wildfires and a recent mountain pine beetle outbreak. We evaluated drivers of burn severity in two study areas that are centered on early progressions of the wildfire complex.

Predictive models of fire severity, using a differenced Normalized Burn Ratio (dNBR) as a response variable, were constructed with spatial autoregression (SAR) and ordinary least squares modeling. Significant predictor variables of dNBR include treatment type, landform (elevation and slope), fire weather (minimum relative humidity, maximum temperature and average wind for each burn progression interval), and vegetation characteristics including canopy closure and cover type. The spatial autoregressive term of the SAR models has high predictive power to identify areas of high and low severity. Classification of recent mountain pine beetle outbreak areas is a significant predictor of burn severity, but the effect on dNBR is not consistent between study areas. Treatment age and size are weak but significant predictors of burn severity. In general, burn severity increases slightly with treatment age and is reduced in larger treatment areas.

The Tripod Complex fires were one of several regional fire events in 2006. A common interpretation of weather-driven fire events is that bottom-up controls, including fuels and topography, are superseded by climatic factors and are relatively unimportant. However, even during extreme weather, landform, vegetation and fuels clearly influenced patterns of fire severity and spread in the Tripod Complex fires. Fuel treatments that included recent prescribed burning of surface fuels were particularly effective at mitigating fire severity. In contrast, units that were mechanically thinned from below and those with sanitation cuts in which small trees were cut and piled tended to burn at moderate to high severity.